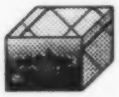
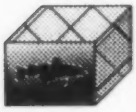
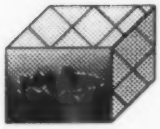
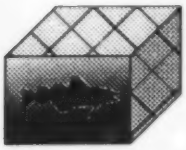


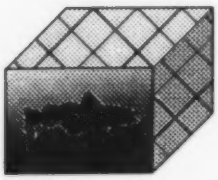
Newfoundland Mobile Gear Selectivity Workshop (1992)



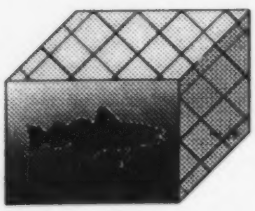


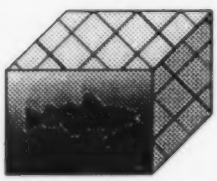
Summary Report

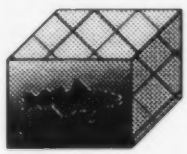


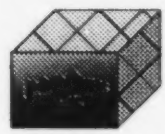


St. John's, Newfoundland
April 27-28, 1992









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Newfoundland Mobile Gear Selectivity Workshop (1992)

Summary Report

Introduction

On April 27-28, 1992 in St. John's, Newfoundland, the Department of Fisheries and Oceans (DFO) in partnership with Fishery Products International (FPI) organized a technical information exchange and industry consultation on **Mobile Gear Selectivity** experiments being conducted in Eastern Canada and Europe.

The primary purpose of the workshop was to present and exchange technical information on mobile fishing gear selectivity activities conducted in Canada and Europe. The workshop also provided fishermen with an opportunity to discuss issues related to the Newfoundland fishery, and to continue with the process of developing and introducing harvesting technology which will ensure the economic viability and sustainability of the resource.

Delegates included mobile gear trawler captains, inshore fishermen and industry representatives from Newfoundland, as well as government officials, consultants and mobile gear designers/manufacturers.

Specialists from eastern Canada, England, Norway, Scotland and the United Nations Food and Agriculture Organization (FAO) presented results of gear selectivity experiments and discussed future applications of gear selectivity in the fishery in eastern Canada.

Gear selectivity refers to the design and modification of fishing gear which allows immature fish and/or non-target species to escape during harvesting operations, thus reducing pressure on fish stocks.

During the two-day workshop delegates were given an overview of mobile gear selectivity initiatives including the following topics:

- **A Canadian perspective**
- **Newfoundland offshore mobile gear selectivity activities**
- **Inshore mobile gear selectivity activities in the Gulf of St. Lawrence**
- **An international perspective**
- **The Norwegian experience**
- **The United Kingdom experience**
- **The North Sea experience**

In addition to the formal presentations and working group discussions, delegates were given a demonstration of trawl gear selectivity models at the Newfoundland and Labrador Institute of Fisheries Marine Technology Flume Tank. The Flume Tank demonstrations allowed delegates to see scale model applications of some of the theoretical concepts examined during the workshop's plenary sessions.

This report provides a brief summary of the various presentations and participants' views on future directions which might be pursued by government and industry.

Background

The Department of Fisheries and Oceans actively promotes more responsible (selective) fishing methods. It provides a common level of understanding of and appreciation for the volume and type of selectivity work currently being conducted nationally and internationally. It presents the results of recent mobile gear selectivity projects carried out by gear specialists in Atlantic Canada and by experts in Europe.

The Department examines the implications of recent developments from an economic, biological, harvesting and processing perspective. It helps build consensus regarding appropriate future directions for selectivity research and development activities.

It is moving towards defining a strategy to introduce specific technologies to ensure a sustainable commercial fishery and, is taking the lead in gear selectivity research and development, encouraging responsible fishing practices and providing sustainable resource management.

It is proceeding on the basis of full consultation with all interested parties, particularly fishermen and processors. Results from selectivity experiments will help fishermen adjust to changing circumstances, prove or disprove current notions regarding selectivity and its impacts on fish stocks, contribute to fishery management plans and, determine, in consultation with fishermen and the industry, the course of future work to be conducted in gear selectivity.

The Canadian Perspective

As a result of the current serious resource problems afflicting Canada's fishing industry, high priority will be placed on fishing gear selectivity initiatives designed to allow immature fish and non-targeted species to escape during harvesting operations.

The Department of Fisheries and Oceans has initiated Fish Capture Selectivity briefings and workshops in conjunction with industry throughout the country and have included Newfoundland presentations on short lastage ropes, the SORT-X System and square versus diamond mesh. The Scotia-Fundy Region has made presentations on horizontal panels and the Nordmöre Grate. In the Gulf region, presentations have been made on mesh size assessment and split panel trawling.

As is the case with most fisheries-related research and development being conducted by the Department of Fisheries and Oceans, selectivity projects in Atlantic Canada have been conducted with the full knowledge of, and with participation by, the fishing industry - inshore and offshore sectors.

There is general consensus that some stocks, particularly groundfish, are in jeopardy. There is uncertainty as to whether recent catch failures (groundfish) have environmental causes or are the result of questionable fishing practices. There seems to be a growing willingness to set aside competitive tendencies to seek common solutions, to attempt to harmonize the environment and the economics of the industry.

Some fishermen, however, are reticent about making changes to gear or being involved in a process which might have this result over time. They cite possible increased regulation and reductions in total catches or incomes as possibilities. They also have a concern that fish conserved in this way will ultimately go to other sectors or to foreign interests, rather than to those who make whatever sacrifices are required to achieve conservation objectives.

Andrew Duthie
Chief, Fisheries Technology Division
Department of Fisheries and Oceans
Ottawa

Scotia/Fundy Region Gear Selectivity Experiments

The Department of Fisheries and Oceans has, for some time, been successfully conducting selectivity experiments throughout Atlantic Canada. Since 1990, there have been experiments conducted on shrimp grates in an effort to limit the by-catch of other species and to limit the loss of shrimp. The results of the shrimp grate experiments have been quite promising. In the Scotia/Fundy region for

example, the by-catch of groundfish dropped from 47% to 4.2% with the use of a grate on the research vessel the Lady Hammond and from 39% to 1.7% on a commercial vessel. Shrimp loss was as low as 1% to 2%.

Even though the shrimp grate program has been deemed an overall success, some problems have been encountered. Specific problems include : the handling of the gear was found to be time-consuming; the grate often bent or twisted, causing a loss of catch; and there was a problem with jellyfish blocking the grate. To alleviate these problems, it was suggested that two grates could be used - one on a lower angle with a bigger bar spacing to dispose of the jellyfish and a second standard grate to dispose of by-catch.

Another project involves the use of a cod/haddock separator trawl. There were some problems initially, but in a 1991 cruise, there were promising results. The cod and haddock were separated successfully, and the trawl is now considered to be in good working order.

Several projects are in the planning stages for next year in the Scotia/Fundy Region involving Sortex, Harbour Porpoise, Silver Hake and Danish Seiner Selectivity experiments.

Chris Cooper
DFO - Scotia/Fundy

Newfoundland Offshore Mobile Gear Selectivity

The Department of Fisheries and Oceans, Newfoundland Region, in cooperation with Fishery Products International has carried out a number of mobile gear selectivity studies during the past two years. The purpose of these studies was to determine the most appropriate method of operating or rigging a groundfish otter trawl to reduce the catch of juvenile groundfish, cod in particular.

The experiments included comparisons of results obtained from a regular codend with those taken from a codend with lastage ropes shortened respectively by 20%, and by 15%. Other experiments compared the selectivity characteristics of 130mm square mesh codend to a 145mm diamond mesh codend and an experiment investigated the effectiveness of using a SORT-X System in an otter trawl to reduce the catch of juvenile cod fish.

Results indicate that 20% and 15% shortened lastage roped codends, square mesh codends and 140mm diameter codends release a high percentage of fish under 43cm. The SORT-X System results did not indicate that the system was effective in reducing the catch of juvenile fish. It is believed the SORT-X System's effectiveness may be reduced by fish density.

Other findings suggest that square mesh codends are prone to knot slippage and subsequent mesh distortion, which seems to be accelerated by very large catches. It was also found that lastage rope codends offer more advantages from a handling and maintenance perspective than square mesh codends. Therefore, future attempts at finding an effective means of releasing small fish should concentrate on this method.

Gerry Brothers — *Ray Bowering*
DFO, St. John's — *Fishery Products International*

Gulf of St. Lawrence - Inshore Mobile Gear Selectivity

A number of DFO-sponsored size selectivity projects took place in the Gulf of St. Lawrence in 1991-92. Projects such as the adaptation and assessment of the Nordmöre Grate, the use of the split panel trawl for the segregation of flatfish from cod, and the design and testing of a shrimp separator trawl.

There were five additional selectivity projects undertaken as a part of juvenile fish research in the DFO Gulf region last year. These included increased mesh size selectivity studies for mobile gear, mid-water trawling assessment for the shrimp fishery, a preliminary assessment of small Scottish seiners mesh size, a mesh size selectivity assessment for hake in the Northumberland Strait, and a selectivity study into American plaice diamond mesh.

Marcel Boudreau
DFO, Quebec

Overview of International Gear Selectivity

The destruction of juvenile fish by trawl technology is a serious concern for the major fishing countries of the world. The discard level from the mobile gear fishery is still too high even though selective technologies exist which could reduce or eliminate the problem.

ICES is currently concerned with three major issues affecting international fisheries. The first is the selective capacity of prawn trawls, a fishery which has an extremely high discard level. The second is square mesh and the use of square mesh windows in trawls to allow juvenile fish to escape. The third is open mesh. It is not enough to simply increase mesh size. Other methods have to be investigated, including lastage ropes, shortened netting and longitudinal ropes.

ICES reports that many stocks in the North Sea have been dramatically reduced. Too many juvenile fish are being destroyed. In an effort to remedy this situation the fishing industry is now becoming involved in experiments and scientific assessments investigating gear selectivity. An important factor to consider is the survival rate of fish escaping from the nets. ICES believes that there is no point in introducing new devices if fish will not survive after escaping nets. The burden of proof will be on researchers

to prove that fish preserved will survive to sustain future commercial harvesting operations and/or to reproduce.

Stocks in the North Sea are declining dramatically. Discards of juvenile fish from mobile trawls is at about the same level of human consumption of fish.

Countries that border on the North Sea are also investigating more selective gears using various devices. Fishermen are becoming more involved in experimentation and with the work of the research vessels. The size of the diamond mesh used has increased in the North Sea four times in the last few years. However, mesh-size increases alone mean that marketable fish are lost - so fishermen are saying that they want to look at other options - square mesh and lastage ropes.

Jack Robertson
Fish Capture Section
Marine Laboratory
Aberdeen, Scotland

The Norwegian Experience

Experiments in Norway in the past five years have resulted in the introduction of the SORT-X System for size selectivity of fish. This solid and fixed sorting grid in the upper aft section of the trawl has been tested as an alternative to mesh size regulation of trawl codends.

The results have been positive and show improved size selectivity. Target species for trawlers operating in Norway's Barents Sea used to be cod and haddock, while species like Greenland halibut, redfish and pollack were more or less regarded as a low-value bycatch. Today, cod and haddock are taken as a bycatch because of the extremely low quotas established for the trawler fleet. Meanwhile, there is promising growth in both the cod and haddock stocks in the Barents Sea, and, during the last three spawning seasons, very high recruitment to these stocks has been observed.

The strong 1989 and 1990 year-classes of cod and haddock are expected to be found in trawl catches this year. It is believed that large areas of the Barents Sea will be closed to trawlers this year because of high numbers of juvenile fish in the stocks. This situation is expected to continue for the next two years.

Roger B. Larsen
The Norwegian College of Fishery Science
University of Tromsöat, Norway

United Kingdom - Industry Experience

Significant development in gear selectivity have been made over the last year in the United Kingdom. There was very effective use made of underwater film, which not only convinced fishermen that the selectivity experiments were working, but also convinced politicians and the general public.

There have been new developments in underwater technology which allow fishing vessels to select the species and the size of fish to be caught. This video technology will allow the monitoring of selective gear in action to confirm whether it works and whether fish that have escaped, survive.

It is important for scientists, industry, and government to work together on gear selectivity. It was suggested, however, that, in the UK, the major participants are in total conflict with one another, and that this is leading to unnecessary duplication of effort.

John Ashworth
Fishing Gear Technologist
England
United Kingdom

The FAO Perspective

The Food and Agriculture Organization (FAO) of the United Nations is concerned that apart from overfishing, the marine resources are being threatened. The effects of pollution of the ocean's environment and poor resource management decisions have taken a toll.

The FAO reports that as far back as 1965 there have been experiments to increase the selective efficiency of trawls. Some advances in mobile gear selectivity have been made in developed countries - in the northern latitudes - but much of this is non-transferable to developing nations.

As a result of a growing environmental consciousness internationally, there are a number of international conferences on high seas fishing being held in 1992: the Conference on Responsible Fishing in Cancun, Mexico, the International Council for the Exploration of the Seas, a Technical Consultation on High Seas Fishing (to be held in Rome) and the United Nations Conference on Environment and Development (UNCED).

Lobbying by environmentalists, the tourism industry, and trade regulating bodies is likely to put pressure on commercial fisheries throughout the world to become more conscious of the need to better manage aquatic resources. One obvious way of addressing the long-term resource management issue is to educate industry participants about gear selectivity and to continue the kind of selectivity research being discussed at this workshop.

John Fitzpatrick
Chief, Fisheries Technology
FAO, Rome, Italy

Flume Tank Demonstrations

In keeping with the theme and focus of the workshop, five models demonstrating various finfish and shrimp selectivity devices were demonstrated in the Marine Institute's flume tank. Presenters gave detailed explanations of their models, and video tapes of full scale sea trials were shown between model demonstrations. Participants in the workshop had the opportunity to ask questions of the presenters and to examine the scale models.

Jack Robertson of the Department of Fisheries and Agriculture, Scotland, discussed and demonstrated a square mesh escape panel mounted in the top of a codend extension. The square mesh escape panel and codend were mounted on a low opening demersal trawl. This same trawl was used to show a similar escape panel designed for prawns. Both panels are designed to allow juvenile finfish to escape by exploiting known fish behaviour.

A finfish separator device, the SORT-X, was shown by Roger Larsen from the University of Tromsöat, Norway. Designed for size selection of finfish, the SORT-X allows smaller juvenile fish to escape the codend. A second separator device known as the Nordmöre Grate was also introduced. This device is effective in separating finfish from shrimp by, again, drawing on known fish behaviour.

David Tait of Nordsea Fishing Gear, Dartmouth, Nova Scotia, demonstrated an innovative fishing gear designed for rough bottom fishing which also has implications for reducing halibut bycatch in some fisheries. The 402 Nova groundfish trawl is used with the trawl body detached from the bobbin footgear, thus allowing the lower belly to fly 2 to 3m above the footrope.

An informal session was held after the demonstrations in which fishermen had an opportunity to suggest and try alternative rigging changes in the Flume Tank.

This kind of interactive exercise involving gear technology and fishermen proves to be invaluable in terms of practical application of innovations being developed and in terms of building consensus regarding the direction of future research projects.

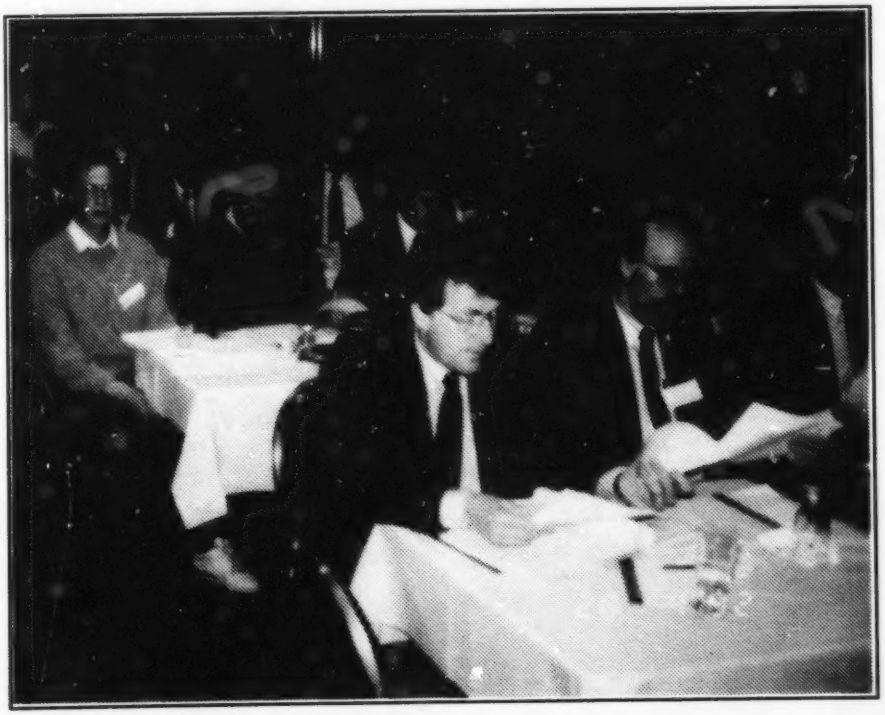
Workshop Discussions

Participants were broken into small discussion groups to discuss several specific questions and to provide government with recommendations on ways of improving future selectivity research programs in Canada. They were asked to identify existing problems and to suggest possible solutions. The groups presented their final reports through rapporteurs.

The following are issues affecting mobile gear selectivity activities in Canada that were identified by participants and recommendations on ways of improving future activities.

Issues Affecting Selectivity Activities

- Scientific projects on gear selectivity have been government-run causing project results to be held in question by fishermen. Communications and dia logue need improvement because many fishermen believe that they are being left out of the decision-making process with regard to gear selectivity.
- Fishermen are upset that some regulations appear to encourage discards and/or capture of juvenile fish. They are committed to conservation and protection of the resource, and believe that selectivity problems can be solved if projects are carried out correctly.
- Government needs the involvement of fishermen in gear selectivity experiments throughout the process. Very often fishermen are told not to worry when they would prefer to be involved.
- The downturn in the resource has led to reduced levels of return in the fishing industry.
- Selectivity could be a major route through which government and industry can enhance the resource, yet not enough attention has been paid to it.
- The Scottish seine fishery in the Gulf of St. Lawrence already considers that they are losing too many fish due to selectivity measures.
- Mobile gear selectivity should not be made to fit all gear types.
- Grids have caused problems for shrimp fishermen in the Gulf and in the northern areas where fishermen have to operate in ice. There was a need identified to establish a grid that can operate on a drum, which smaller boats could use.
- It is important to experiment with finding improved bottom trawls to better direct the redfish fishery when cod by-catch is involved. Fishermen are catching too much cod as a by-catch in this fishery.
- There is tremendous overcapacity. While not directly related to selectivity, overcapacity is going to severely constrain the Canadian fishing effort in the future.



Recommended Approaches

- Projects should really be joint initiatives between government and fishermen from beginning to end.
- More work should be carried out on commercial vessels, in commercial operations.
- Industry should increasingly lead the way and there should be a leadership role for fishermen in resource and project management.
- Fishermen are getting mixed signals from the industry on an acceptable size for marketable fish. This issue should be resolved.
- The profile of gear selectivity has to be raised throughout the entire industry.
- There is a real need to start now to identify initiatives that have to be taken species-by-species in the region.
- Selectivity must work to allow for not only the escapement of juvenile fish, but the recruitment of this fish back into the stock. In other words, the non-targeted fish must survive selectivity.
- Ghost fishing should be curtailed by an organized effort to retrieve lost gill nets at the end of the fishing season.
- Finally, fishermen want to see real and continuing commitment to gear selectivity. They do not want to see worthwhile projects begun, completed and then forgotten. Momentum must be maintained so that the potential of selectivity is fully realized by the industry.

Summary

Atlantic Canada's fishing industry must continue its technological development to remain competitive in the international market place. While technical innovations in the past have increased productivity and efficiency in the industry, sustainable development, in terms of the resource and the environment, has recently become a major consideration. While a great deal of fishing gear selectivity work has been conducted in eastern Canada, there is a requirement to do considerably more experimentation in this area.

Numerous mobile gear projects aimed at improving catch selectivity and overall efficiency, while reducing environmental impact, are underway in Canada and other parts of the world. They will be part of an overall global strategy to evolve Codes of Conduct for Responsible Fishing and Sustainable Development. Technologies must be designed, developed, demonstrated and used which are selective, cost-efficient and environmentally friendly.

A major cornerstone to all Department of Fisheries and Oceans-sponsored selectivity experiments and workshops is the continued involvement of fishermen and the fishing industry.

The issue of gear selectivity is not simply an issue of conservation; it is an issue about sustainable fisheries development. A sustainable resource provides for a sustainable income and therefore a sustainable livelihood. There is a great deal of work to be accomplished in developing selective harvesting technologies. It has to continue to be a high priority for the industry and for the Department of Fisheries.